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(54) **Deblistering machine.**

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Description

The present invention relates to an apparatus for extracting articles, especially pharmaceutical tablets, from blister packs.

Blister packs are a very common means of packaging pharmaceutical tablets. Such packs generally comprise a sheet of initially flat clear plastics material in which are formed a series of wells. A tablet is inserted into each of the wells, the open ends of which are sealed by means of a sheet of aluminium foil which is attached to the plastics material sheet. Each tablet is thus sealed in its own well until use, when the clear plastics blister is depressed by finger pressure and the tablet is forced out through the foil backing.

Although deblistering would normally only be done by the consumer, there are reasons why some faulty packs have to be deblistered on a pharmaceutical tablet blister pack production line. First, occasional tablets may be lost on tracks or because of malformed blisters or leaks. Secondly, it is necessary to deblist a calender pack if the tablets are found to be out of registration with dates marked on the pack. Thirdly, the well-forming station (which is usually a punching station) and sealing station may be out of register—it may be that nothing is wrong with the tablets themselves in such a case, but the appearance of the pack would be less than desirable. Fourthly, the batch number, which is applied after the packs are sealed, may be unclear. Fifthly, it may occasionally be found useful or necessary to reclaim old stock.

Deblistering a large number of packs by hand is both time-consuming and costly. A number of machines have therefore been devised for this task, but have suffered from several disadvantages. One such machine, for instance, tends to crush the tablets on extraction; another tends to remove a portion of foil from the back of each blister when a tablet is removed; and it appears to be a general failing of such machines that they are not adjustable to take differently sized blister packs without the use of a spanner. Because of work safety regulations in force in some countries, this operation can require a fitter.

An apparatus suitable for extracting articles from a blister pack is known from EP-A No. 9538, which apparatus comprises a first member having a recess defined by a first recess-defining portion and a second recess-defining portion, and a second member, the first and second members being adapted to hold a blister pack and the second member being adapted to bear on one or more blisters of a blister pack when so held so as to displace an article, when enclosed by one of said blisters, out of the blister pack towards the recess. According to the present invention, the first recess-defining portion is translationally movable with respect to the second recess-defining portion.

The first and/or second member(s) may be plates, but it is preferred that the first and second members both be parallel rollers. In such a case,

the recess-defining portions, which may be serrated, are desirably formed from one or more dogs or collars of the first roller and it is preferred that the position of a least one of the recess-defining portions be movable, with respect to the second roller, in a direction parallel with axes of rotation of the rollers. Means may therefore be provided for moving the or a recess-defining portion. The moving means may comprise an electromagnetically operable device but preferably comprises a manually operable lever, the lever conveniently being provided with locking means for locking it in one of a plurality of positions and advantageously being operable against and/or with the action of spring-biasing means.

In a preferred embodiment, means for collecting deblistered blister packs and/or articles extracted from blister packs is provided. The collecting means may comprise an outlet in a casing for the apparatus and/or one or more receptacles. Sorting means, such as an appropriate sieve, may also be provided for sorting articles extracted from blister packs from deblistered blister packs.

The apparatus may comprise guide means for guiding a blister pack to a position where the blister pack can be gripped by the first and second rollers. The guide means may enable a blister pack to be guided to different positions along a line parallel with the axis of rotation of the first roller.

So that an appropriate force may be exerted on the blisters by the second member to displace an article enclosed by a blister, it is preferred that the first and second members be spring-biased towards one another.

For a better understanding of the present invention, and to show how it may be put into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Fig. 1 shows a perspective view of an apparatus in accordance with the present invention;

Fig. 2 shows a plan view of part of the apparatus shown in Fig. 1;

Fig. 3 shows an exploded front elevational view of part of the apparatus shown in Fig. 1; and

Fig. 4 shows an exploded front elevational view of another part of the apparatus shown in Fig. 1.

Referring first of all to Fig. 1, there can be seen an apparatus 1 in accordance with the present invention, which comprises a base 3, and an essentially cubic housing 5 having a front wall 7, a back wall (not shown), a left-hand side wall 9, a right-hand side wall 11 and an upper surface 13. The upper surface 13 comprises an opaque, metal rear portion, 13a, covering approximately the rear three quarters of the upper surface, and a transparent plastics material front portion 13b, covering the front quarter of the upper surface. Between the front portion 13b and the rear portion 13a is a transverse slit 15 through which a blister pack to be deblistered can be inserted. Located approximately centrally on the upper surface 13 is a guide means 17 for guiding the feeding of a blister pack through the slit. The guide means 17 is generally similar to a lathe turret feed and

comprises a cuboid structure 19 rotatable about a centrally located vertical axis in such a way that any of the four lateral sides of the cuboid may lie along the slit between the front portion 13b and the rear portion 13a of the upper surface. On top of the cuboid structure 19 is located a locking screw 21 on the axis of rotation of the guide means 17. The locking screw 21 can be loosened manually for the guide means 17 to be rotated, and then tightened, also by hand, when the guide means 17 is in the desired orientation. It will become apparent later why it is desirable to have different lateral faces of the guide means 17 adjacent to the slit 15.

Through the clear front portion 13b of the upper surface can be seen a first member in the form of a first roller 23, which is shown in greater detail in Fig. 2 and 3. The first roller 23 has a horizontal axis of rotation and is journaled into the left- and right-hand side walls 9 and 11 of the housing 5. The first roller 23 may be caused to rotate by rotating a belt gear 25 located outside the left-hand side wall on a shaft 27 which is formed as an extension of the first roller 23.

To the left-hand end of the first roller 23, but inside the left-hand side wall 9, there is mounted a first gear wheel 29, which meshes with a second gear wheel 31 mounted on a second roller 33 lying adjacent to the first roller 23 and journaled in a left-hand mounting block 35 and a right-hand mounting block 37 affixed to the inside of the left- and right-hand side walls 9 and 11 respectively by means of respective bolts 39 and 41.

The second roller 33 constitutes a second member. The journaled of the second roller 33 may be such as to spring-bias the second roller 33 against the first roller 31 but, whether this feature is present or not, the second roller 33 will, in use of the apparatus 1, route in an opposite sense to that of the first roller 23.

Apart from the second gear wheel 31, the second roller 33 has a smooth surface 43 and is of uniform diameter. The left-hand half of the first roller 23, that is the portion adjacent to the first gear wheel 29, is the same diameter as the second roller 33, and, apart from a radial serrated band 45 at the right-hand end of this half of the first roller 23, has a smooth surface 47. The right-hand half of the first roller 23 has only about two thirds the diameter of the left-hand half. A fixed dog 49 is mounted on the right-hand half of the first roller 23 a short distance from the centre of the roller. The radius of the fixed dog 49 is the same as the radius of the left-hand half of the roller, and the edge is serrated. To the right of the fixed dog 49 a slidable collar 51 is mounted. The slidable collar 51 comprises two serrated radial dogs 53 and 55 having the same diameter as the left-hand half of the first roller 23 and a neck 57 joining these two dogs. The neck 57 has a wider bore, of course, than the diameter of the right-hand half of the first roller 23 (so as to be able to fit over it), but a narrower diameter than the left-hand half. The right-hand end of the slidable collar 51 is a smooth-surfaced anchoring portion 59, which has a diameter the

same as the diameter of the left-hand end of the first roller 47. The left-hand end of the slidable collar 51 is serrated. The anchoring portion 59 has a radial circular hole 61 spanning its entire diameter for accommodating a plug 63 (Fig. 3). The plug 63 is located in a diametrical slot 65 in the first roller 23, by virtue of which the plug 63, and hence the entire slidable collar 51, can move axially with respect to the remainder of the first roller 23.

In use of the apparatus 1, a blister pack is fed between the first and second rollers 23 and 33 with the blisters directed towards the second roller 33, which has a smooth surface along its entirety, the blister pack being so positioned that articles contained within the blisters can be pushed out of the blisters through the back of the blister pack into the recess defined by two dogs of the first roller 23 or by a wide diameter portion of the first roller 23 and a dog which thereby constitute recess-defining portions of the first roller. It will be understood that by varying the axial position along the rollers at which the blister pack is fed into the apparatus, differently sized blister packs may be accommodated and deblistered. Similarly, by moving the slidable collar 51 axially along the first roller 23, blister packs of differing sizes may be deblistered by the apparatus. Articles forced out of a blister pack being deblistered are collected in a drawer 67 (Fig. 1) which slides on the base 3 into the front of the apparatus 1 through an appropriately shaped hole in the front surface 7 of the housing 5.

The position of the slidable collar 51 is determined by a selector mechanism 69, details of which are apparent from Fig. 3 and 4. The slidable collar 51 is, as has already been described, mounted on the right-hand half of the first roller 23, that is, the half with the narrower diameter. A bore 71 is formed along the axis of the first roller 23 from the right-hand end and terminates in the slot 65 within which the plug 63 may move axially along the first roller 23. A rod 73 is inserted into the bore 71 and terminates within the plug 63, which is also provided with a bore 75, where it is retained by a pin 77. The other end of the rod 73 is journaled in a bearing 79, where it is fastened by a nut 81 and a bolt 83 to a selector arm 85 extending upwardly at right angles to the axis of the first roller 23. The free end of the selector arm 85 is provided with a handle 87 for ease of manual manipulation and extends through a casing 89 for the selector mechanism 69. Lateral movement of the selector arm 85 causes the rod 73 to move axially with respect of the first roller 23 and will cause the position of the slidable collar 51 to be altered with respect to the first roller 23. A gate may be provided in the casing 89 of the selector mechanism 69 so that the selector arm 85 can be locked in one of a plurality of axial positions by appropriate rotary movement of the selector arm 85 about the axis of the first roller 23. The selector mechanism 69 may incorporate a spring so that the slidable collar 51 is spring-biased to the left-hand end of the first roller 23.

It will be appreciated that differently sized blister

packs may be deblistered with relative ease. The position of the recesses and recess-defining dogs of the first roller 23 may be altered by means of the selector mechanism 69, and, in addition, the blister packs themselves may be fed to the apparatus at different axial positions by means of the guide means 17 comprising the lathe-type turret feed. The arrangement in Fig. 1 shows two faces of the turret feed, there being a channel for accommodating the blisters of a blister pack at a different relative position on each face. This enables blister packs to be fed between the first and second rollers 23 and 33 at different axial positions along the first roller. A clear plastics material sheet covers each channel, the better to guide the blister packs between the first and second rollers 23 and 33.

Claims:

1. An apparatus (1) suitable for extracting articles from a blister pack, which apparatus comprises a first member (23) having a recess defined by a first recess-defining portion (53) and a second recess-defining portion (49) and a second member (33), the first and second members (23 and 33) being adapted to hold a blister pack and the second member (33) being adapted to bear on one or more blisters of a blister pack when so held so as to displace an article, when enclosed by one of said blisters, out of the blister pack towards the recess, characterised in that the first recess-defining portion (53) is translationally movable with respect to the second recess-defining portion (49).
2. An apparatus according to Claim 1, characterised in that the first and second members (23 and 33) are both parallel rollers.
3. An apparatus according to Claim 1 or 2, characterised in that the recess-defining portions (53 and 49) are formed from one or more serrated dogs or collars of the first roller.
4. An apparatus according to Claim 1 or 2, characterised in that at least one of the recess-defining portions (53) is movable, with respect to the second roller (33), in a direction parallel with axes of rotation of the rollers (23 and 33).
5. An apparatus according to any one of Claims 1 to 4, characterised in that the apparatus comprises means (69) for moving the or a recess-defining portion.
6. An apparatus according to Claim 5, characterised in that the moving means (69) comprises a manually operable lever (85, 87) provided with locking means for locking the lever in one of a plurality of positions and being operable against and/or with the action of spring-biasing means.
7. An apparatus according to any one of Claims 1 to 6, characterised in that the apparatus comprises means (67) for collecting deblistered blister packs and/or articles extracted from blister packs.
8. An apparatus according to any one of Claims 1 to 7, characterised in that the apparatus comprises means for sorting articles extracted from blister packs from deblistered blister packs.

9. An apparatus according to any one of Claims 1 to 8, characterised in that the apparatus comprises means (17) for guiding a blister pack to a position where the blister pack can be gripped by the first and second members (23 and 33).

10. An apparatus according to any one of Claims 1 to 9, characterised in that the first and second members (23 and 33) are spring-biased towards one another.

Patentansprüche:

1. Vorrichtung (1), die zum Herauslösen von Gegenständen aus einer Blasenpackung geeignet ist, wobei die Vorrichtung ein erstes Teil (23) mit einer Aussparung, die durch einen ersten, die Aussparung definierenden Abschnitt (53) und einen zweiten, die Aussparung definierenden Abschnitt (49) definiert ist, und ein zweites Teil (33) besitzt, wobei das erste und das zweite Teil (23 und 33) angepasst sind, eine Blasenpackung zu halten, und das zweite Teil (33) angepasst ist, eine oder mehrere Blasen einer Blasenpackung zu tragen, wenn sie so gehalten wird, um einen Gegenstand, wenn dieser von einer der Blasen umschlossen ist, aus der Blasenpackung auf die Aussparung hin zu verschieben, dadurch gekennzeichnet, dass der erste, die Aussparung definierende Abschnitt (53) fortschreitend relativ zu dem zweiten, die Aussparung definierenden Abschnitt (49) beweglich ist.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass das erste und das zweite Teil (23 und 33) beide parallele Walzen sind.
3. Vorrichtung nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, dass die Aussparung definierenden Abschnitte (53 und 49) aus einem oder mehreren gezackten Nocken oder Manschetten der ersten Walze geformt sind.
4. Vorrichtung nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, dass mindestens einer der die Aussparung definierenden Abschnitte (53) relativ zu der zweiten Walze (33) in einer Richtung parallel mit den Rotationsachsen der Walzen (23 und 33) beweglich ist.
5. Vorrichtung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass die Vorrichtung eine Einrichtung (69) zum Bewegen der Abschnitte oder eines der Aussparung definierenden Abschnitte umfasst.
6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, dass die Bewegungseinrichtung (69) einen von Hand zu bestätigenden Hebel (85, 87) enthält, der mit einer Verriegelung zum Festlegen des Hebels in einer aus einer Vielzahl von Positionen versehen ist, und gegen und/oder mit der Wirkung einer Federdruckeinrichtung betätigbar ist.
7. Vorrichtung nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass die Vorrichtung Einrichtungen (67) zum Sammeln von entleerten Blasenpackungen und/oder aus Blasenpackungen entfernten Gegenständen enthält.
8. Vorrichtung nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, dass die Vorrichtung Einrichtungen zum Sortieren von Gegenständen

aufweist, die aus Blasenpackungen von entleerten Blasenpackungen entfernt worden sind.

9. Vorrichtung nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, dass die Vorrichtung Einrichtungen (17) zum Führen einer Blasenpackung zu einer Position, in der die Blasenpackung durch das erste und das zweite Teil (23 und 33) ergriffen werden kann, enthält.

10. Vorrichtung nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, dass das erste und das zweite Teil (23 und 33) durch Federbelastung gegeneinander gedrückt werden.

Revendications:

1. Appareil (1) approprié pour extraire des articles d'un emballage alvéolé, cet appareil comprenant un premier élément (23) pourvu d'un évidement défini par une première partie de définition d'évidement (53) et par une seconde partie de définition d'évidement (49), ainsi qu'un second élément (33), les premier et second éléments (23 et 33) étant adaptés pour maintenir un emballage alvéolé et le second élément (33) étant adapté pour s'appuyer sur une ou plusieurs alvéoles d'un emballage alvéolé lorsqu'il est ainsi maintenu afin de déplacer un article, lorsqu'il est enveloppé par une desdites alvéoles, hors de l'emballage alvéolé en direction de l'évidement, caractérisé en ce que la première partie de définition d'évidement (53) est mobile par translation par rapport à la seconde partie de définition d'évidement (49).

2. Appareil selon la revendication 1, caractérisé en ce que le premier et le second élément (23 et 33) sont deux rouleaux parallèles.

3. Appareil selon une des revendications 1 ou 2, caractérisé en ce que les parties de définition

d'évidement (53 et 49) sont formées par un ou plusieurs taquets ou bagues striés du premier rouleau.

4. Appareil selon une des revendications 1 ou 2, caractérisé en ce que, au moins, une des parties de définition d'évidement (53) est mobile par rapport au second rouleau (33), dans une direction parallèle aux axes de rotation des rouleaux (23 et 33).

5. Appareil selon une des revendications 1 à 4, caractérisé en ce que l'appareil comprend un moyen (69) pour déplacer la ou une partie de définition d'évidement.

6. Appareil selon la revendication 5, caractérisé en ce que le moyen mobile (69) comprend un levier manœuvrable manuellement (85, 87) pourvu d'un moyen de blocage pour bloquer le levier dans une parmi plusieurs positions et manœuvrable en opposition à et/ou en association avec l'action d'un moyen de poussée élastique.

7. Appareil selon une des revendications 1 à 6, caractérisé en ce que l'appareil comprend un moyen (67) pour collecter des emballages alvéolés vidés et/ou des articles extraits d'emballages alvéolés.

8. Appareil selon une des revendications 1 à 7, caractérisé en ce que l'appareil comprend un moyen pour trier des articles extraits d'emballages alvéolés par rapport à des emballages alvéolés vidés.

9. Appareil selon une des revendications 1 à 8, caractérisé en ce que l'appareil comprend un moyen (17) pour guider un emballage alvéolé jusque dans une position où l'emballage alvéolé peut être saisi par le premier et le second élément (23 et 33).

10. Appareil selon une des revendications 1 à 9, caractérisé en ce que le premier et le second élément (23 et 33) sont poussés élastiquement l'un vers l'autre.

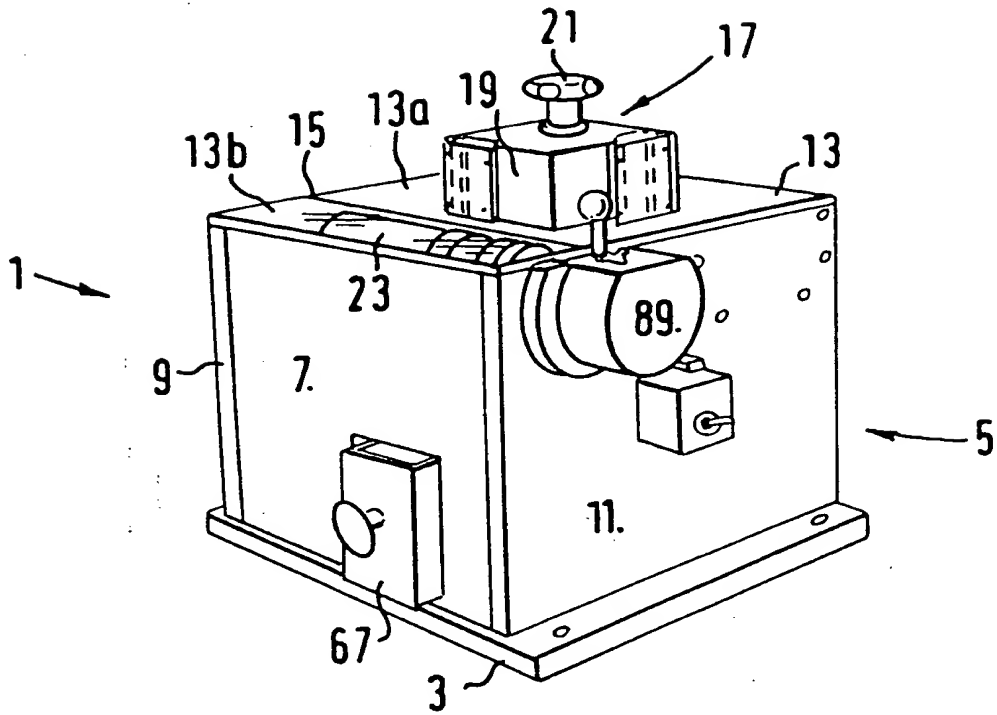


FIG. 1

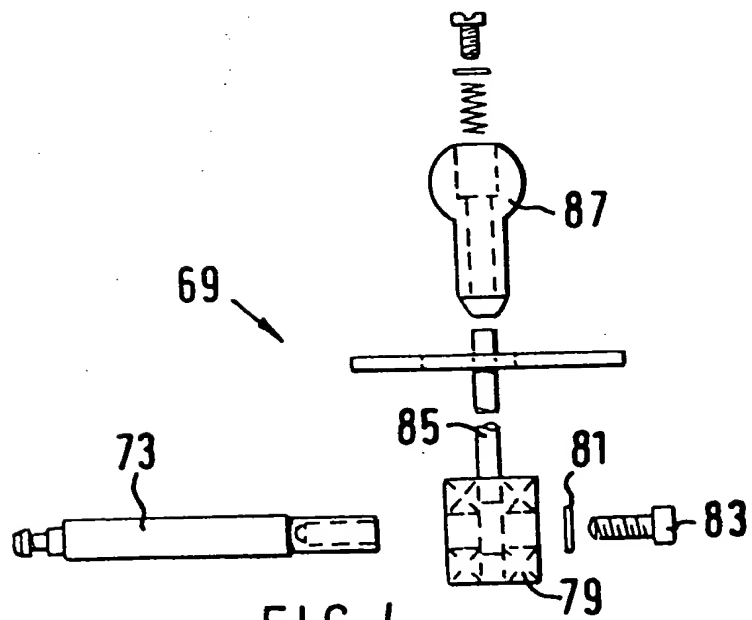


FIG. 4

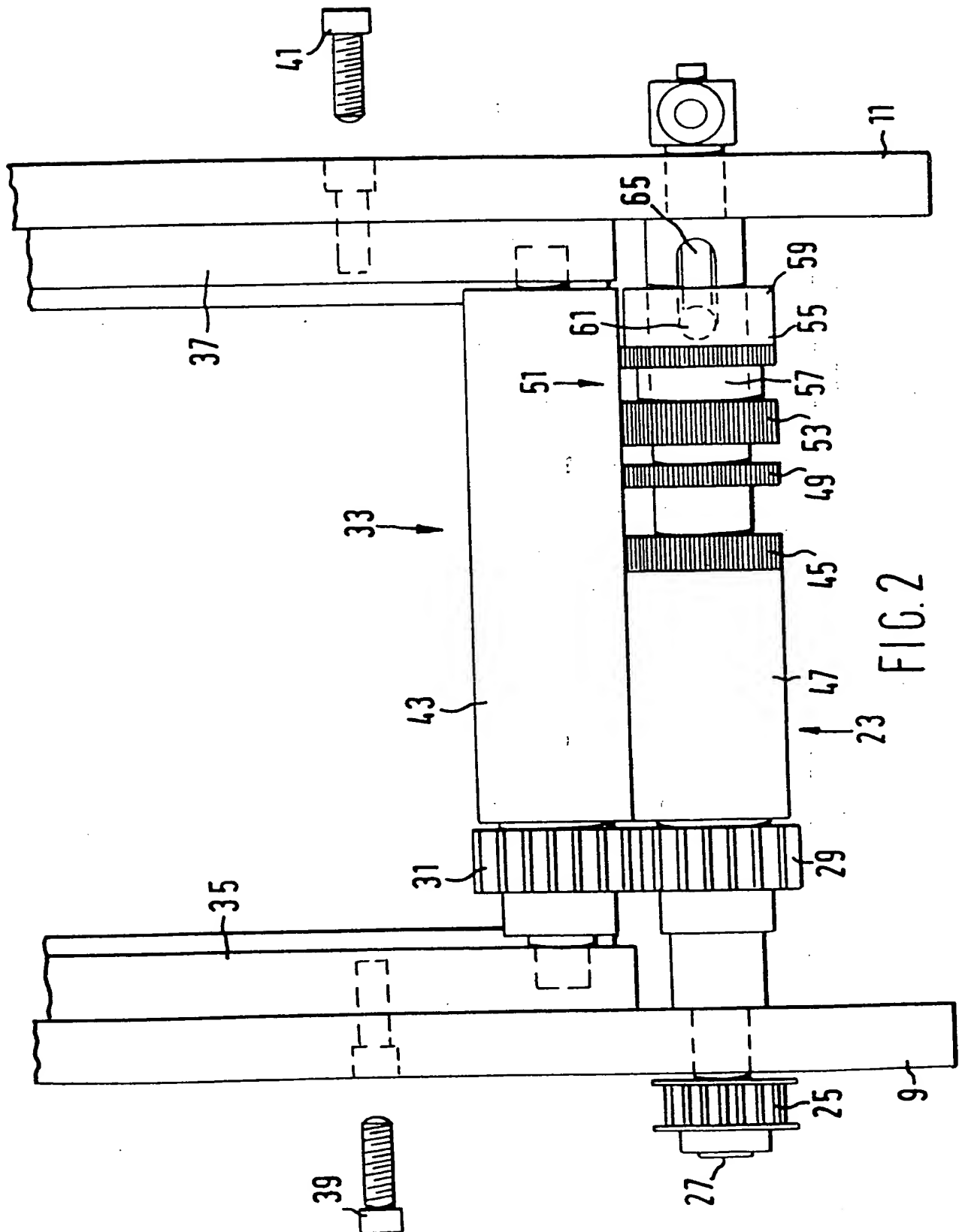


FIG. 2

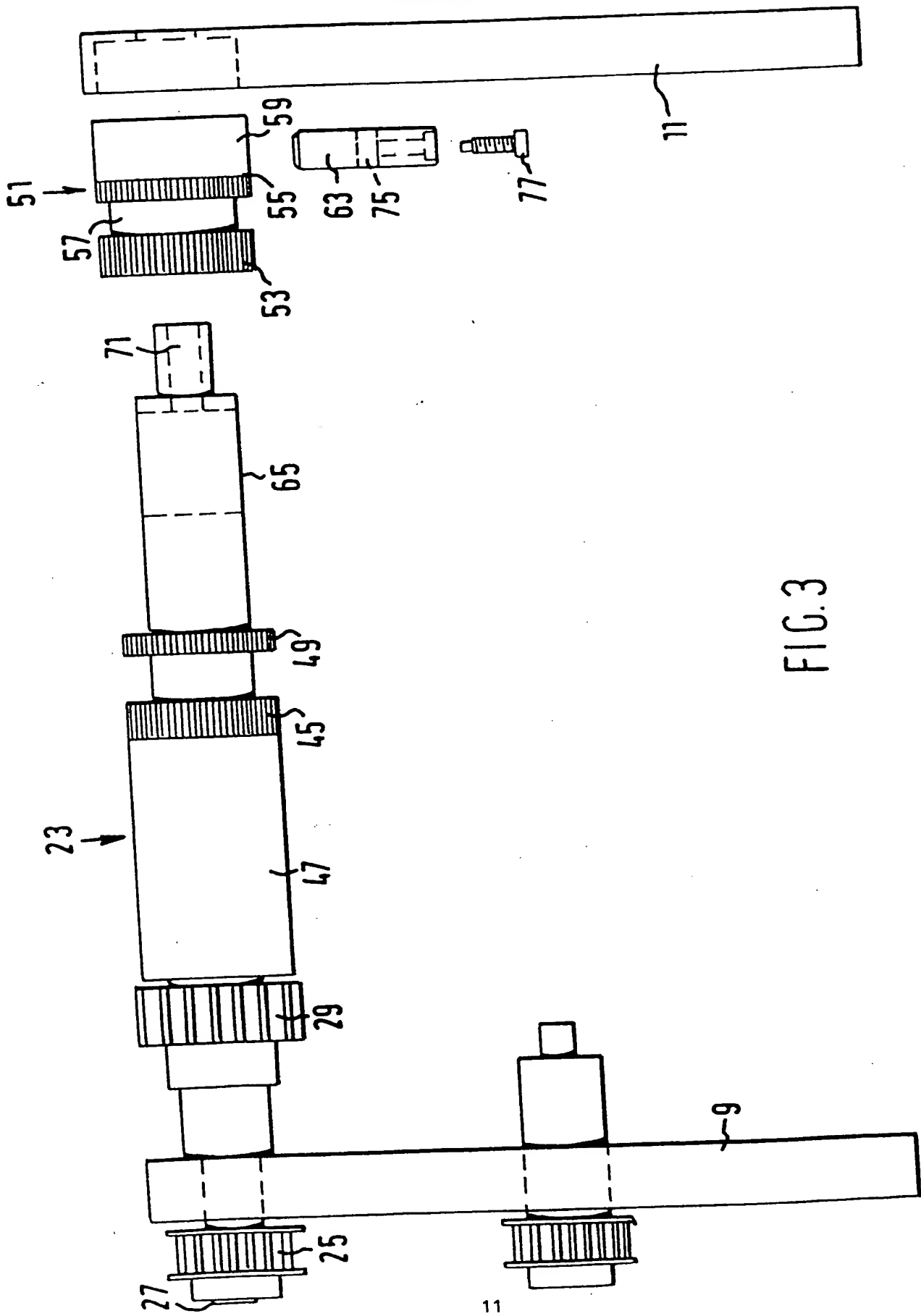


FIG. 3